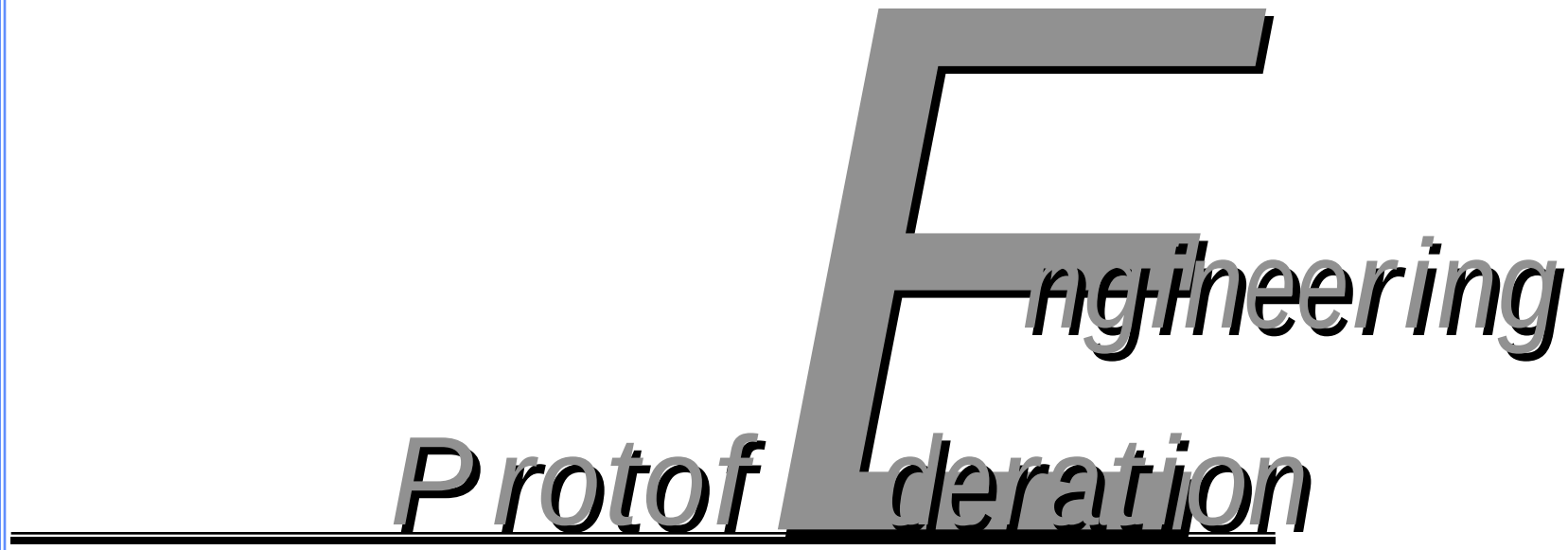


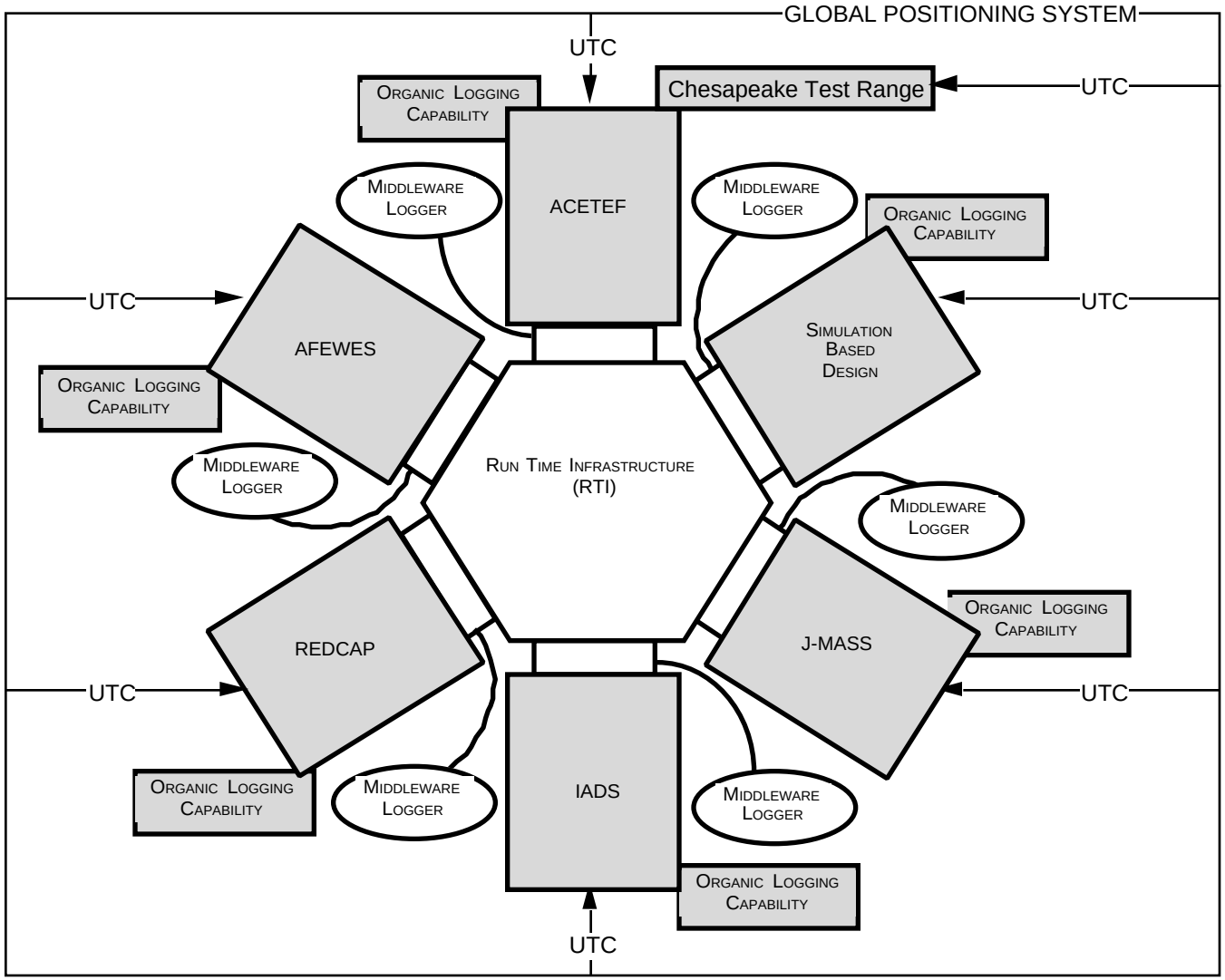
Defense High Level Architecture for Distributed Modeling & Simulation

Analytical Approach

Briefing for the Architecture Management Group
April 24, 1996

"T&E Suitability Facility" for Evaluation of HLA

Protof Engineering deration



- **High-Impedance Middleware Service Call Logger**
- **Time Synchronized**
- **Manned by T&E Engineers**

Exploiting the Analytical Infrastructure

Protof Engineering

- Fundamental Assumption: All data will be time-tagged with time tags which will be accurate and synchronized to within 1millisecond of UTC.
- The Kind of Data Collected and the "Tap Points" will differ from Test to Test.
  - High Impedance Middleware Logger
    - Data is Homogenous. Requires no post-processing.
    - Limited to collection of RTI Service Calls
  - Organic Logging Capabilities
    - Kinds of data collected can be tailored to test objectives
    - Post-Processing will be required to bring data into comparable formats for analysis
      - Organic Logger to Organic Logger
      - Organic Logger to Middlewar Logger

Self-Documenting Test Process

- Test Outline Drawn from TEMP
  - Includes Scenario Data
  - Includes Data Format Requirements
  - Assigns Analytical Responsibility per TEMP
  - Includes Data Collection and Broad Analytical Guidance
- Test Procedure Drawn from Test Outline
  - Detailed, Step-by-Step Directions for Test Conduct
  - Includes Detailed Objectives, Countdowns, Go/No-Go Criteria, Comm Plans
- Analysis Plan
  - Who will do what, with what data, and how.

Sample Data Collection Directives

[DTI-B (1) through (3)]

Protof ngineering deration

- **High-Impedance" Prime Directive**
  - **DO NOT** collect data in such a way as to have **ANY** effect on the federation's RTI runtime performance.

- **Data To Be Collected**
  - RTI Service Calls
    - Each Federate Will Record Every Service Call
      - To the RTI
      - From the RTI
  - Each Federate Will Record Their System Configuration
    - Hardware Description
    - O/S
    - How RTI is integrated (One-Page Graphic or Prose)
    - Simulation Software Description (Half-Page Prose)
  - Each Federate Will Provide Data In Accordance With:
    - The Data Collection Standard
    - The Data Analysis Plan

Sample Data Standard
[DTI-B (1) through (3)]

Protof Engineering deration

- **In-House File Specifications**
  - During Execution, Data Can/Should be Collected in the Best/Most Convenient Way.
  - In-house Data Enconding & Structures
  - House-preferred recording media
  - File Specs Below Apply Only to Data Delivered For Analysis
- **Analysis File Specifications (8mm Tape Media-Unix Text Files)**
  - <CR><CR>Header<CR>Record<CR>Record.....Record<CR>Trailer<CR><CR>
- **Analysis File Header Specification**
  - ASCII TEXT STRING
    - `START*HLA ENG PROTOFED DT-1B(1)THRU(3)TEST DATA*START`
- **Analysis File Record Specification**
  - Time Tag<comma>Service Call<comma>Call Contents
    - `Time Tag: 15 CHARACTER ASCII STRING`
      - `(E.G. 032696<SPACE>00000001 IS 1 MILLISECOND INTO THE 26TH OF MARCH, 1996)`
    - `Service Call: ASCII Representation of Service Call Page Number Per V0.3 RTI Interface Spec. Table of Contents`
    - `Call Contents: ASCII Text Representation of Service Call Contents Per ICD V0.21`
- **Analysis File Trailer Specification**
  - ASCII Text String
    - `END*HLA ENG PROTOFED DT-1B(1)THRU(3)TEST DATA*END`

Sample Analysis Plan
[DTI-B (1) through (3)]

Protof Engineering deration

- **Files to be put on media, MediaProperly Marked for Security & Identification and sent to:**
  - Naval Air Warfare Center AC Division
    Atlantic Ranges & Facilities (Attn: D. Paterson)
    516200A, MS-3, 48108 Standley Rd
    Patuxent River, MD 20670-5304
- **The Data Provided Will Be Sufficient to Support Analyses of:**
  - Latency
    - Sim-to-Sim via RTI on T1 Latency
    - Sim-to-Sim via RTI on DSI Latency
    - Sim-to-Sim via RTI on DSI/TI Combination Latency
  - Off-Nominal Call Behavior
    - Calls Dropped
  - Number of Calls/Second For This Scenario Complexity
    - To be used to support refined estimates of final scenario minimum requirements
  - Data Throughput
    - Amount of Actual Sim-to-Sim Data Transferred Over Time
  - T1 to DSI Patency
    - Number of Service Calls on DSI vs Number of Service Calls on T1
- **Product:**
  - Report of Findings

The TEMP-Driven Process

(Goal Oriented Approach to the Task at Hand)

Protof Engineering deration

- Review the TEMP (Issue-to-MOE/MOP Mapping)
- Decide if we are prepared to test
  - What data can we collect?
  - What issues can be closed through analysis of this data.
  - If an issue can be closed; we are prepared.
  - Issue the Test Outline/Procedures/Analysis Plan
- Test
- Have we collected a valid data set?
  - If so, (1) get ready for the next test and (2), execute the Analysis Plan
  - If not, fix...
    - The RTI, Federate(s), Analytical Infrastructure, Analytical Approach
- Have we collected a complete set of Analyses?
  - If so, Summarize and Provide Recommendation(s) to Sponsor(s)

TEMP Overview

Engineering
Protof deration

- Tailored DoD 5000.29M Format
  - OT&E Tailored Out
  - Issue Driven
- Evaluation Issues Described
- Issues Mapped to Data Products with Responsible Organization
- Issues Mapped to Clearly Identified & Roughly Scheduled Tests
- Identified Tests Mapped to MOEs (MOPs Where Applicable)

Test Phases

Protof Engineering

- 3 Main Test Phases
  - February to May 1
    - Workups
      - Objectives: Make Sure that the Test Infrastructure is in place
      - Generating Test Data which is being used to refine the Architecture Development
  - May to June 1
    - Scenario Testing
      - Objectives: Make Sure that the DPG Threat Environment is in place
      - Generating Test Data which will be used to refine the Architecture Development
  - June 1 to Completion
    - Objective Execution
      - Objectives: EC Testing
      - Generating Test Data which will be used to “Evaluate the Architecture”